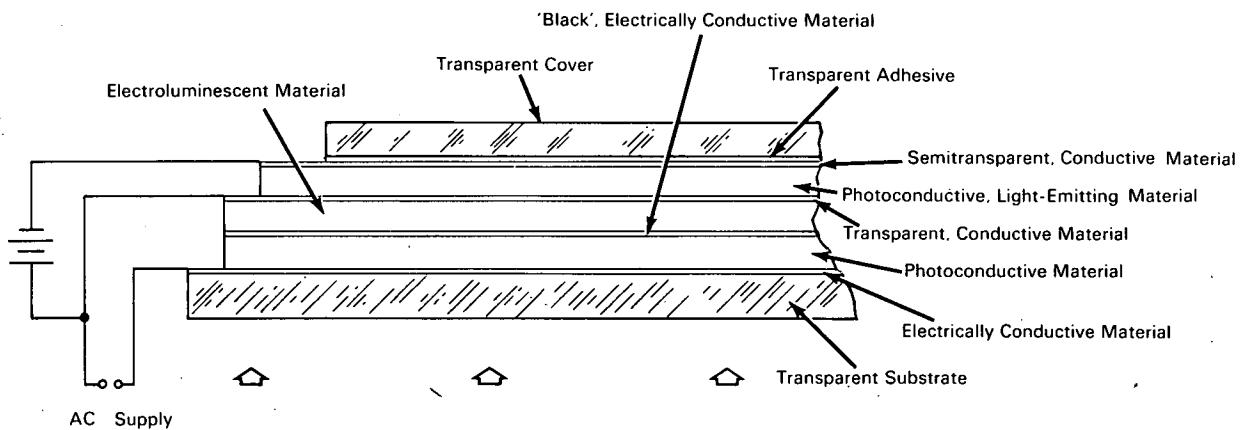


NASA TECH BRIEF



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Improved Radiographic Image Amplifier Panel



A layered image amplifier for radiographic (X-ray and gamma ray) applications, which is under development, offers a number of advantages over conventional layered devices used for radiographic image amplification. The new device is of relatively simple construction and provides images of higher contrast and better resolution over longer storage periods than are attainable with previous image amplifiers of this type. The device also combines very high radiation sensitivity (10 milliroentgens, or less, of penetrating radiation required for optimum display, compared to 350 milliroentgens for a "Thorne" image amplifier) with fast image buildup and erasure capabilities. These characteristics are achieved by adding a layer of material that is both photoconductive and light-emitting to a basic image amplifier and cascading this assembly with a modified "Thorne" panel. When excited by X-ray or gamma ray radiation directed through a test specimen or anatomical region, the image amplifier produces a daylight-visual image of the radio-

graphic structural details in its field of view.

The complete image amplifier panel consists of a number of layers, as follows:

- (1) a transparent substrate
- (2) an electrically conductive film (preferably of tin oxide) which is transparent to the incident radiation
- (3) a photoconductive film (typically activated cadmium sulfide or cadmium selenide)
- (4) a "black" electrically conductive material, which blocks any light emitted by layers (5) and (7) from leaking back into layer (3)
- (5) an electroluminescent film, which emits visible light when passing electric current
- (6) a semitransparent, electrically conductive film (such as a thin film of gold or platinum)
- (7) a material that is both photoconductive and light-emitting
- (8) a semitransparent, electrically conductive film
- (9) a transparent adhesive film

(continued overleaf)

(10) a cover of transparent material through which the radiographic image formed in layer (7) can be viewed.

In this design, layers (1) through (5) constitute an image amplifier of conventional design; layers (6) through (10) are a modified "Thorne" panel, which is a second image amplifier in cascade with the basic first-stage image amplifier. Contacts to the electrical power supply are made at layers (3), (6), and (8). The total weight of a typical (10 inch x 10 inch) panel including battery power supply, is less than 10 pounds.

The panel is exposed similarly to X-ray film, but requires much less radiation and shorter time to develop than the film. The image on the stored panel remains visible for long periods after X-ray excitation is cut off. This image can be photographed and erased

when desired in a fraction of a second leaving the panel ready for reuse. The imaging and erasure cycles can be repeated many thousands of times. This device should find advantageous application in industrial and medical radiography.

Note:

Technical details may be obtained from:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B68-10363

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: R. L. Brown, Sr.
(MFS-14522)